computer peripherals

INSTRUCTION MANUAL

#81-810001

PRINTELEX
MODEL T40-160

PRIMARY EDITION

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INTRODUCTION

Read the following instructions before connecting your Printelex to the computer.

1. After unpacking the printer, please examine all of the items enclosed. You should have one of each of the following:

   A. One power pack
   B. One roll of paper
   C. One printer
   D. One user's manual

2. Inspect the product for any damages whatsoever. Please advise Computer Peripherals immediately if any defect is found.

3. If you have not ordered an interface cable from us, you will need one to connect the printer to the computer. Please call us to obtain a cable.

4. Do a quick check on the operation of the printer in the following manner:

   . Load paper into the printer (See Figure 1).
   . Plug the power pack into the printer. The power pack is keyed to go in only one way. Plug the power pack into any wall electrical outlet. Make sure that the rating in line A.C. voltage is the same as that indicated on the power pack.
   . Depress the "paper feed" switch and turn on the power switch of the printer. Continue holding the paper feed-switch down. The printer will be in the self test mode and print a predefined pattern of a full 96 ASCII character set. Now, your printer is ready to be connected to the computer. Snap open the lid at the back of the top cover of the printer and examine the 8-position dip switch setting. Set the dip switch to your operating requirement. Both RS 232 serial and paralled centronic interfaces are on the same connector. The printer will operate in one or the other mode, depending on the setting of the 8-position dip switch.

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DESCRIPTION

Your printer is enclosed in an ABS plastic molded case. This case is resistant to impact damage. It should be kept clean and wiped if necessary with a damp cloth. Do not use any chemical or wax to clean the machine. Major components accessible to you are as follows:

1. Top Plate. This can be snapped open to reach the friction paper feed roller if paper is jammed.
2. A set of paper holders can be snapped in at the back side of the top cover to hold paper.
3. ON/OFF switch on the side
4. Paper feed switch on the top.
5. Power connector at the back.
6. Interface connector at the back.
7. Window plate on the bottom of the top cover.

Window plate, when snapped open, will expose an 8-position dip switch. The switch is needed to set different standard options available in the printer.

Ventilation slots are provided on the top and on the bottom of the printer for convection cooling of the internal components. This printer should always be placed on a hard surface to enable maximum air circulation in and out of the cooling vents.

Power Requirements

The label at the bottom of the printer indicates the correct input voltage. Serious damage may result from attempting to operate the printer from any other power source other than what is specified.

It is recommended to switch the printer off when not in use. The power switch is located on the right hand side of the printer.

Printer Paper

The printer is designed to use standard thermographic heat sensitive printing paper in roll or fan fold form. The size and the length of the paper is given in the specification section at the back of the manual.

Important: Do not expose paper to direct sunlight or excessive heat. Avoid using abrasive paper. Use same type of paper or equivalent to what is recommended.

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Paper Loading

The paper loading is done from the back and the bottom part of the friction feed as indicated in figure 1. The paper goes in from the bottom and comes out on the top. There is a mechanical lever on the top. That lever is to be pulled back to snap the head up. The paper is then inserted in the bottom end of the rollers. As it comes out on the top, pull it up with two fingers and align the paper horizontally. Snap forward the lever--moving the print head down to lock in the paper at the desired position. Confirm that the paper is feeding correctly by pressing the paper feed switch. Check to make sure that the paper remains properly centered within the thermal area. When you are satisfied that the threading is correct, the excess paper may be removed by tearing off the edge of the top plate.

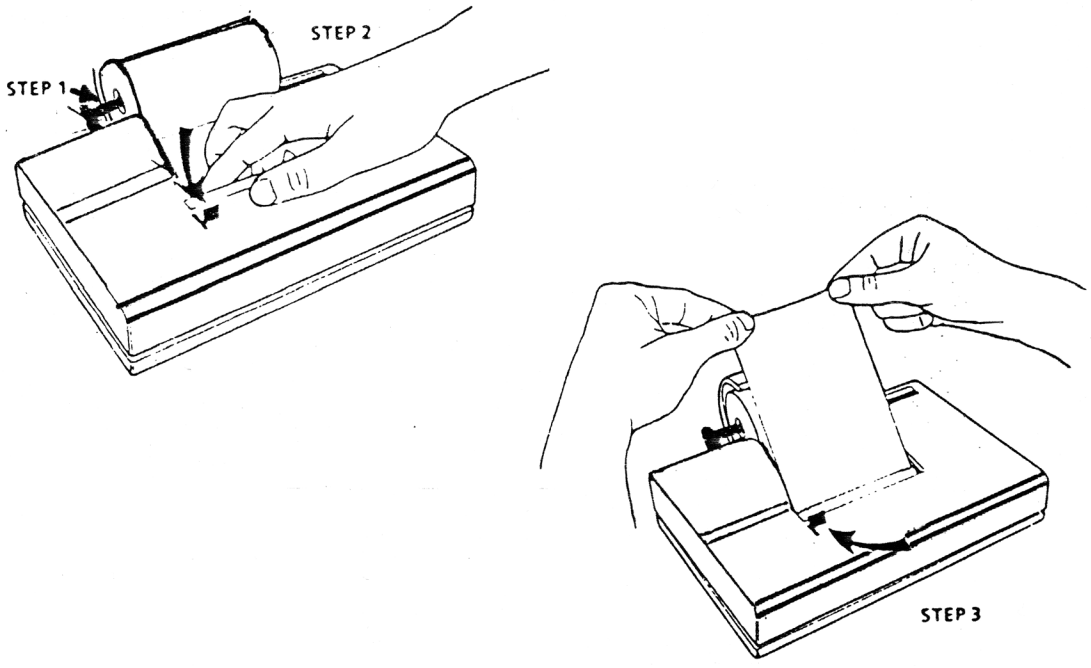

FIGURE 1

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OPERATION

. Self Test

Turn the printer on while keeping the paper feed switch depressed. The printer will go in the self test mode and print a predefined test pattern of a full 96 ASCII character set. As long as the switch is kept down, the self test will repeat and continue. As soon as the paper feed switch is released, the printer will go in the paper feed mode If it becomes depressed again, then it will first do paper feed.

. Paper Feed

Turn the printer on and push the paper feed button down. At this time, the printer will move the paper.

. On Line Print

Set up the dip switch in the printer to the parallel centronic mode or serial RS 232 mode.

1. If it is set to the parallel mode, then you do not have to worry about any other bit definition. At this time, plug the interface connector of the computer to the printer. Please ensure that the mating and signal to pin assignments are compatible. Turn the printer on. You should now be able to print the data from your computer on the printer.
2. If your printer interface is set to serial RS 232 Asynchrononous interface, refer to chart on table 1 to set the 8-pin dip switch to the desired baud rate, number of data bits, stop bit, start bit, etc. Basically, the serial interface looks for a start bit, 8 data bits, and one or more stop bits. The data bits are transmitted with the least significant bit first and the most significant bit the last. The sequence is as follows:

Start bit (high)
Data 0
Data 1
Data 2
Data 3
Data 4
Data 5
Data 6
Data 7 (high)
Stop bit (high)
Stop bit (low)

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After the transmission of the complete byte, transmission of the next byte may begin. If not, the data line should assume the inactive level which is represented by a low level.

To enter into the graphic mode, the host computer has to send a code CNTRL-G. The printer will accept the first dot line from the host computer and start the printing operation, complete the printing of the current dot line and accept the request for the next dot line. When the computer stops sending the graphic data, the controller " times out " of the graphic mode.

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PROTOCOL DEFINITIONS

. Centronic Parallel: All of the data in the printer is encoded in a 7-bit group (whether it is character or graphic in nature) and only seven lines are needed to transfer each byte of information. In order to signal the printer data that is available on the seven data lines, a control signal is required to tell the printer. This signal is " Data Strobe ". Note that the " Data Strobe " line must be held low for at least 2 microseconds before the transition to the TTL high state. Upon receipt of Data Strobe transition to the high state, the printer will pause for about 25 microseconds to allow the signals to stabilize on the interface cable. Sample the state of the seven data line then assert the " Busy " signal as an active High level to the host. The host computer must not alter the state of the data lines until the busy signal is asserted by the printer (that is, set to High level). Just prior to the removal of the Busy signal, another signal known as " acknowledge " (ACK) is asserted by the printer. This indicates that the furnished Data Byte had been processed. The ACK signal is removed simultaneously with the removal of the Busy signal. ACK is furnished as an active low signal which returns to High level upon removal of Busy.

Note: The data may come on 8 data lines. The eighth bit is ignored and thrown out as all of the 96 ASCII characters and is comprised of 7 bit codes.

. Serial RS 232: The serial interface has three lines required.
1. Serial Data 2. Ground 3. Data Set Ready
Theoretically, it is encoded as a positive and negative voltage swings-centered at zero voltage. They should swing more positive than 3 voltages to represent logic zero (0) and more negative than -3 voltages to represent logic one (1). In the pointer, any signal more positive then +2.4 voltages is recognized as logic zero (0). and more negative than +0.4 voltage will be recognized as logic one (1). In transmission, the Start Bit emerges as a High (>+2.4 voltages) signal, and Stop Bit emerges as a Low (<+0.4 voltages) signal. Data bits appear as inverted, in that zeros are represented as High signals and ones are represented as Low signals The eighth bit value is ignored. On the transmission of Data Start, the clear to send line will be asserted during the Start bit and will be removed during the first or second Stop Bit. Hence, remove to allow the transmission of the next byte, unless the printer starts a print operation.

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. Graphic: In this mode, the printer starts the graphic mode at the initiation of CNTR-G along with dot Bit Stream. The data sent by the host must be continuous. During the thermal head reversal time, Printelex will open up conditions to accept data for the next dot line. It must accept all of the graphic data within a specified time frame; otherwise, the printer will time out of the graphic mode. Typically, it takes 25 milliseconds to print one 40 dot line. Hence, host computer must be able to prepare the 40 bytes of data within 20 milliseconds and transfer it during the remaining approximately 5 milliseconds. Within each line of dots, the first byte of data plotted will be placed in the left most print column and the fortieth byte will be placed in the right most print column. The printed image will be 280 dots in width.

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CONTROL CODE DEFINITION

Carriage Return (CR) Octal 15 Decimal 13 Hex 0D

The "CR" character is used to provide normal printing of a character line. Since many computers contain software which generate CR and LF codes in paired combinations, the printer will ignore the LF code if it immediately follows the CR code. The physical printing operation begins when the CR code is received.

Line Feed (LF) Octal 12 Decimal 10 Hex 0A

The "LF" code functions in a similar manner as to CR code. When the LF code is received, printing is initiated. If a CR code immediately follows an LF code, the CR code will be ignored.

Form Feed Octal 14 Decimal 12 Hex 0C

This code causes the printer to skip to the top of the next logical page, based on the current page size setting. The initial page size setting matches the standard 11' fan-fold paper available for the printer. The printer assumes it is at the top of a page when the power is turned on, when the PAPER ADVANCE switch is used, or after a CNTRL-Q code is received.

CNTRL-G (Graphics) Octal 07 Decimal 07 Hex 07

This code can be thought of as an escape to the graphics mode. It can be received when using a parallel interface capable of supplying data rapidly to the printer. Following receipt of this code, the printer will immediately enter the graphic mode of operation.

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STANDARD OPTION

Auto-Wraparound

The printer also includes the ability to "wraparound" any character in excess of the 40 characters which will fit onto the normal print line. In this mode, the printer interface will go "Busy" following the receipt of the fortieth character. It will physically print the characters in the buffer, clear the buffer, and return to accept more characters. In this manner, if the host computer contains unmodifiable software (such as in a ROM BASIC system) which will try to print character lines wider than 40 characters, the printer will automatically print those extra characters on the following line rather than truncating them. This permits the printer to be used in applications formerly requiring an 80-column.

Auto-Form Feed Mode

Fan-folded paper may be used with your printer - a slot at the rear of the paper cover permits entry of an external paper pack and, if selected, skips across the fold line between pages automatically. The controller counts the printed lines so it will know how many lines to skip when a form feed command is received.

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RECOMMENDED PAPER TYPES

DaiEi Papers (USA) Corp.

PW60C
PS65B

MITSUI & CO. (U.S.A.), INC.

TP50CM-AX	Blue
TP50KM-AX	Black

JAPAN PAPER & PULP CO. (JUJO)

Paper Type: TP50CM-A (Blue)
TP50KM-A (Black)

Handling and Care of Thermal Paper

Handling

Computer Peripherals Incorporated recommends the following guidelines to ensure the best results when using thermal paper:

1. Handle paper as carefully as possible - a fingernail or hard metal object touching the surface (or other frictional heat created by touching the surface) may cause image development.

Storage

1. Store unused paper in an ambient temperature of less than 25°C (77°F) and a relative humidity of less than 65%.
2. File printed paper immediately after use in an ambient temperature of less than 25°C (77°F) and a relative humidity of less than 65%.

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3. Do not store printed surfaces facing each other in order to prevent image transfer from one paper to another.
4. Avoid exposure to direct sunlight (example: near windows) and high temperatures (example: car trunks).

With proper storage and handling, the unprinted thermal paper has a 5-year shelf life. The printed image also has a 5-year shelf life. [Reference: "Technical Data of Jujo Thermal Paper," Mitsui and Co. (U.S.A.), Inc. 1982].

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INTERFACE CONNECTOR DEFINITION

PRINTELEX
25 Pin D - Shell Female

PIN 1	Strobe/Serial Data
PIN 2	Data Bit 1
PIN 3	Data Bit 2
PIN 4	Data Bit 3
PIN 5	Data Bit 4
PIN 6	Data Bit 5
PIN 7	Data Bit 6
PIN 8	Data Bit 7
PIN 9	N/C
PIN 10	$\overline{\text{ACKNLG}}$
PIN 11	Busy
PIN 12	N/C
PIN 13	N/C
PIN 14	N/C
PIN 15	DSR
PIN 16	N/C
PIN 17	N/C
PIN 18	GND Ø V
PIN 19	GND Ø V
PIN 20	GND Ø V
PIN 21	GND Ø V
PIN 22	GND Ø V
PIN 23	GND Ø V
PIN 24	GND Ø V
PIN 25	GND Ø V

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ASCII 7 BIT-CODE CHARACTER-SET TABLE 1

LSD	MSD	0 000	1 001	2 010	3 011	4 100	5 101	6 110	7 111
0	0000			SP	0	@	P	'	p
1	0001		Q	!	1	A	Q	a	q
2	0010		RJ	"	2	B	R	b	r
3	0011		S	#	3	C	S	c	s
4	0100			$	4	D	T	d	t
5	0101			%	5	E	U	e	u
6	0110			&	6	F	V	f	v
7	0111	^G		'	7	G	W	g	w
8	1000			(	8	H	X	h	x
9	1001			)	9	I	Y	i	y
A	1010	LF		*	:	J	Z	j	z
B	1011	VT		+	;	K	[	k	{
C	1100	FF		'	<	L	\	l	|
D	1101	CR		-	=	M	]	m	}
E	1110			.	>	N	^	n	~
F	1111			/	?	O	-	o	

DIP SWITCH POSITIONS

POSITIONS	2	3	4	BAUD RATE SELECT
	ON	ON	ON	110 BAUD
	OFF	ON	ON	150
	ON	OFF	ON	300
	OFF	OFF	ON	600
	ON	ON	OFF	1200
	OFF	ON	OFF	2400
	ON	OFF	OFF	4800
	OFF	OFF	OFF	9600

POSITIONS	1	6	WRAPAROUND SELECTION
	ON	ON	RIGHT JUSTIFY WRAP
	ON	OFF	LEFT JUSTIFY WRAP
	OFF	ON	UNUSED
	OFF	OFF	NO WRAPAROUND

POSITIONS	5	UNUSED

POSITION	7	PAPER SELECT/AUTO FORM FEED
	ON	ROLL PAPER/NO AUTO FORM FEED
	OFF	FAN-FOLD/AUTO FORM FEED

POSITION	8	INTERFACE MODE
	ON	SERIAL INTERFACE (RS-232)
	OFF	PARALLEL MODE (CENTRONICS)

ON = CONTACTS CLOSED
OFF = CONTACTS OPEN

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WARNING

This equipment generates and uses radio frequency energy and, if not installed and used properly, that is, in strict accordance with the manufacturer's instruction, may cause interference with radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference with radio or television reception, (which can be determined by turning the equipment off and on), the user is encouraged to try to correct the interference by one or more of the following measures:

a. Reorient the receiving antenna.
b. Relocate the printer with respect to the receiver.
c. Move the printer away from the receiver.
d. Plug the printer power supply into a different outlet so that the printer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio-television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

ENJOY USING YOUR NEW PRINTELEX PRINTER!

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